

references, because of its maintenance of antigenic epitopes, presumably in native-like form, and due to the presence of gp160 dimeric and tetrameric structures in this preparation.

Depending on the isolate or clone used, the o-gp160 protein preparation
5 can have a lower molecular weight. For example in the 451 isolate described in detail herein, the gp160 monomer appears to have a molecular mass of about 140 kDa due to a truncation which had not previously been recognized. Such a lower molecular mass truncation variant could be referred to as "gp140" or "o-gp140" due to its apparent molecular mass of about 140 kDa rather than 160 kDa.

10 The compositions of the present invention include variants gp160, whether they be amino acid substitution variants (either natural isolates or genetically engineered variants) as well as truncation variants which may have occurred inadvertently (as is believed to be the case for the 451 isolate) or have been deliberately prepared for any of a number of reasons, including improved secretion from cells. Thus, as used herein, the term "gp160" is intended to encompass the disclosed truncation variant and other presently known or later discovered truncation variants and amino acid substitution variants of gp160.
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20 In a preferred embodiment described below the o-gp160 was obtained from the HIV-1 isolate originally named HTLV-III₄₅₁. This protein is listed on the SWISS-PROT database, (maintained by the National Center for Biotechnology Information of the National Institutes of Health, Bethesda, Maryland) as Seq ID: 119434, and was shown to have the amino acid sequence shown below (in single letter code).

25 This sequence (SEQ ID NO:1) is divided as follows: residues 1-32 are the signal peptide ending with the "/" mark. Residues 33-522 constitute gp120, ending with the "V" mark. Residues 523-868 constitute gp41. It was subsequently discovered that this clone was truncated, with the C-terminal 187 amino acids of gp41 missing. These are indicated by underscoring in the sequence below. Thus, the o-gp160 protein as obtained from the cloned cell line described below has only 30 649 residues (from position 33 to 681 cf SEQ ID NO:1).

GP160 ISOLATE FROM 451

It is noteworthy that a large hydrophobic region of gp160 is retained in this protein and is indicated in the above sequence in italic and boldface and double underscore. This 29mer (from positions 523 to 551) is an example of an endogenous hydrophobic sequence and can be exploited in the vaccine composition.

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1 MAMRAKGIRK NCQHLWRWGT MLLGMLMICS AA/ANLWVTVY YGVPVWKEAT
51 TTLFCASDAK AYDTEAHNVW ATHACVPTNP NPQEVVLENV TENFNMWKNN
101 MVEQMHDII SLWDQSLKPC VKLTPLCVTL NCTDLNTNNNT TNTTELSIIV
151 VWEQRGKGEM RNCSFNITTS IRDKVQREYA LFYKLDVEPI DDNKNTTNNT
201 KYRLINCNTS VITQACPKVS FEPPIHYCT PTGFALLKCN DKKFNGTGPC
251 TNVSTVQCTH GIRPVVSTQL LLNGSLAEEE VVIRSENFTN NAKTIIIVQLN
301 VSVEINCTR P NNHTRKRVTL GPGRVWYTTG EILGNIRQAH CNISRAQWN
351 TLQQIATTLR EQFGNKTIAF NQSSGGDPEI VMHSFNCGGE FFYCNSTQLF
401 NSAWNVTNSG TWSVTRKQKD TGDIITLPCR IKQIINRWQV VGKAMYALPI
451 KGLIRCSSNI TGLLLTRDGG GENQTTEIFR PGGGDMDRNW RSELYKYKVV
501 KIEPLGVAPT KAKRRVVQRE KR\AVGMLGAM FLGFLGAAGS TMGATSMAL
551 VQARQLLSGI VQQQNLLRA IKAQQHLLQL TVWGIKQLQA RILAVERYLK
601 DQQLLGFWGC SGKLICTTAV PWNASWSNKT LDQIWNMMTW MEWDREIDNY
651 THLIYTLIEE SQNQQEKNQQ ELLQLDKWAS LWTWSDITKW LWYIKIFIMI
701 VGGLIGLRLIV FAVLSIVNRV RQGYSPLSFQ TLLPNPRGPD RPEGTEEGGG
751 ERGRDGSTRV VHGFALVWD DLRSCLCLFSY HRLRDLLLIV ARIVELLGRR
801 GWEVLYKWWN LLQYWSQELK NSAVSLVNVT AIAVAEGTDR VIEVVQRIYR
818 AFLHIPRRIR QGFERALL

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Cell Culture and Production of oligo-gp160

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A single cell clone of HUT78 cells has been infected with human immunodeficiency virus type 1 (HIV-1), resulting in a cell line which continuously produces virus. Clone 6D5 is susceptible to chronic infection with HIV-1, as described in Getchell, *et al.*, *J. Clin. Microbiol.* 23:737-742 (1986). Clone 6D5 is infected with a specific strain of HIV-1, HTLV-III₄₅₁, to produce the infected cell line 6D5451 (deposited with the American Type Culture Collection under the Budapest Treaty). The infected cell line is then grown in serum-free medium, by pelleting 6D5451 cells and resuspending them in serum-free medium (such as HB101 or HB104 medium, commercially available from Du Pont). The medium also contains growth supplements such as transferrin, insulin, and bovine serum albumin. To assist in the growth of cells, the cells were subcultured every four days. The 6D5451 cells were grown for 2 to 3 generations. When serum-free

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6D5451 TO 6D5451